Higher Education

The ESE is strengthening its involvement with higher education institutions to ensure that NASA can meet future workforce needs in Earth system science research, applications and related fields, and to improve the scientific education of students bound for other professions. NASA-sponsored programs for college and university faculty are designed to enrich their scientific and technical expertise and help them to establish NASA research contacts. These programs include funding opportunities, workshops and working experiences at NASA Centers, as well as Earth system science curriculum development initiatives.

ESE sponsorship of post secondary students includes research opportunities through programs that provide direct financial assistance and fellowships, along with research and training at NASA facilities and universities. These programs provide opportunities for students to gain experience working with researchers, increase their technical skill, and learn firsthand about Earth system science careers and research.

Center for Coastal Zone Assessment and Remote Sensing

Southern University's Center for Coastal Zone Assessment and Remote Sensing (CCZARS) is a NASA University Research Center—a multidisciplinary research unit established at a minority institution to focus on a specific area of NASA interest. The center is supporting NASA's Stennis Space Center's mission by conducting research in the areas of fisheries habitat assessment, coastal change, land use/land cover change and urban sprawl. CCZARS is also developing related education and outreach initiatives:

- Interdisciplinary faculty research teams will develop course modules and provide technical material.
- A "Distinguished Visiting Researcher" position will be created; incumbent will teach and provide research assistance.
- An undergraduate research program, CCZARS Scholars, will be established, and on-site research experiences for undergraduate and graduate researchers will be provided.
- K–12 students will be introduced to fundamental Earth science concepts and encouraged to pursue careers in science, math, engineering and technology.
- Three-day workshops for current industry partners and K–12 teachers will provide training in geographic information systems (GIS) and remote sensing.
- An annual conference on coastal zone assessment and remote sensing will be held.

CONTACTS: Michael Stubblefield, Director, Southern University and A&M College, PO Box 9764, Baton Rouge, LA 70813, **Phone:** 225-771-4724, **Fax:** 225-771-4722, **Email:** mastub@bellsouth.net; Deidre Hardy-Street, Program Manager, Southern University and A&M College, PO Box 9764, Baton Rouge, LA 70813, **Phone:** 225-771-4724, **Fax:** 225-771-4722, **Email:** dhardy1@bellsouth.net.

Center for Hydrology, Soil Climatology and Remote Sensing's (HSCaRS) Undergraduate Summer Enrichment Program

http://www.aamu.edu/hscars

The Center for Hydrology, Soil Climatology and Remote Sensing at Alabama A&M University in Huntsville conducts the Undergraduate Summer Enrichment Program, which provides summer research opportunities for undergraduate minority and female students in Earth system science. Interns are selected from a pool of highly qualified student applicants from across the nation. The program features an eight-week period of residence at Alabama A&M University—where students have the opportunity to work with a researcher/mentor from the school or the Global Hydrology Climate Center at the National Space Science and Technology Center, also in Huntsville, on general research areas (e.g., micrometeorology, soil data analysis, hydrologic modeling, geographic information systems, soil hydrology or computer science). Research papers resulting from interns' summer projects have been presented at various national conferences. Posters describing the program are mailed in January. Applications are available on the project Web site and are typically due on March 1.

CONTACT: Phyllis Campbell, HSCaRS Research Center, Alabama A&M University, Normal, AL 35762, **Phone:** 256-372-5075, **Email:** pcampbell@aamu.edu.

Chautauqua Short Courses for College Teachers: 2004 Faculty Development Program

http://www.chautauqua.pitt.edu/cal.html

The Chautauqua Short Courses are an annual series of forums in which scholars at the frontiers of various sciences meet intensively for several days with undergraduate science teachers. The series is held at colleges and universities throughout the United States and at selected special sites. These forums provide an opportunity for invited scholars to communicate new knowledge, concepts and techniques directly to college teachers in ways that are immediately beneficial to their teaching. The primary aim is to enable undergraduate teachers in the sciences to keep their teaching current with respect to both content and pedagogy.

NASA's Jet Propulsion Laboratory, the California field center for the Chautauqua Short Courses, is offering the following Earth science-related courses in 2004:

- **Aurora Borealis and Other Arctic Phenomena:** March 19–21 in Fairbanks, Alaska
- **Alternative Energy and Energy Management:** June 2–4 in Irwindale, California
- **Giants of Mauna Kea:** June 15–18 in Hilo, Hawaii
- **Teaching Global Climate and Planetary Change to the Non-Science Major:** July 20–23 in Pasadena, California

The courses are for undergraduate science, math and technology teachers and graduate students in the sciences interested in a teaching career. Secondary school teachers will be allowed to take the course on a space-available basis. Prerequisites: None.

CONTACT: Nicholas Eror, Director, NSF National Chautauqua Program, University of Pittsburgh, 274 Benedum Hall, Pittsburgh, PA 15261, **Phone:** 412-624-9761, **Fax:** 412-624-9585, **Email:** eror@pitt.edu.

Curriculum Improvement Partnership Award (CIPA) Program

http://www.uncfsp.org/cipa

CIPA is a program of NASA's Office of Education, administered by the United Negro College Fund Special Programs Corporation (UNCFSP). CIPA provides selected two- and four-year Minority Serving Institutions (MSIs) grant support to strengthen curricula in academic fields and technical programs directly related to the NASA mission. The specific objectives are to increase the quality and quantity of NASA-related science, technology, engineering and mathematics curricula, and to increase the number of minority students at the pre-college and college levels that study these subjects and pursue careers in NASA-related fields.

The 2003 CIPA awardees with an Earth science focus are:

- **Barber-Scotia College, Concord, NC**
  Barber-Scotia Curriculum Improvement Partnership Program
  Principal Investigator: Selma Burrell
  Email: sburrell@bsc.edu
- **Clinton Junior College, Rock Hill, SC**
  The 3 M's—Motivation, Mentoring and Monitoring
  Principal Investigator: Elizabeth Reid
  Email: ewreid@comporium.net
- **Lincoln University, Jefferson City, MO**
  Successful Undergraduates in Courses Connected to Earth System Sciences (SUCCESS)
  Principal Investigator: Michael Heard
  Email: heardm@lincolnu.edu
- **Los Angeles Valley College, Los Angeles, CA**
  Curricula Upgrade and Science Facilities Improvement Project
  Principal Investigator: Jacquelyn Hams
  Email: hamsje@lavc.edu

CONTACT: Gilbert Knowles, **Phone:** 703-205-7631, **Email:** gilbert.knowles@uncfsp.org.

DEVELOP

http://develop.larc.nasa.gov

DEVELOP is an initiative that extends NASA Earth science research to local communities. Student teams demonstrate to community leaders prototype applications of NASA Earth science measurements and predictions addressing local policy issues. The program is a year-round activity, with teams located nationwide. High school through graduate students with strong interests in science, technology and policy are encouraged to apply.

DEVELOP students initiate and research projects in response to challenges that communities pose at leadership forums, such as governors' conferences and association meetings. Their final research results are presented as computer-generated visualizations. The activity is student-led, with NASA scientists serving as advisors. The student projects use NASA Earth science mission data and models, and cover all 12 NASA applications of national priority: agricultural efficiency, air quality, aviation safety, carbon management, coastal management, disaster management, ecological forecasting, energy management, homeland security, invasive species, public health and water management.

Each project requires partnerships with the target community to achieve the greatest return on investment.

Students work with industry, nonprofit organizations or local governments to attract long-term technology and education benefits to the community.

In addition to the core Earth science applications projects, students also conduct outreach activities. For the purposes of advanced visualization demonstrations, students constructed a portable visual immersion environment. DEVELOP also supports the federal Computers for Learning Program by establishing Earth science education computer labs in schools nationwide.

CONTACTS: DEVELOP National Program Office, MS 307, NASA Langley Research Center, Hampton, VA 23681-2199, **Phone:** 757-864-3761; **Fax:** 757-864-7890, **Email:** michael.l.ruiz@nasa.gov.
DEVELOP Western Regional Office, MS 239-20, NASA Ames Research Center, Moffett Field, CA 94035-1000, **Phone:** 650-604-3614; **Fax:** 650-604-1088, **Email:** joseph.w.skiles@nasa.gov.

Earth Observatory

http://earthobservatory.nasa.gov

NASA's Earth Observatory is an interactive Web-based magazine where the science-attentive public can obtain new satellite imagery and scientific information about our home planet. The focus is on Earth's climate and environmental change. The site is also designed to be useful to public media and educators. Any and all materials published on the Earth Observatory are freely available for re-publication, re-use or re-broadcast (except in rare cases where copyright is indicated).

Visit the Earth Observatory to read feature articles on wide-ranging Earth system science topics, download datasets and images for analysis, read breaking news, learn about current and planned Earth missions, search an online library for reference materials, track natural hazards around the world in near real time, and access interactive experiments and classroom activities.

CONTACT: David Herring, Code 913, NASA Goddard Space Flight Center, Greenbelt, MD 20771, **Phone:** 301-614-6219, **Email:** dherring@climate.gsfc.nasa.gov.

Earth Science Component for Academic Professional Enhancement (ESCAPE)

http://tellus.ssec.wisc.edu/outreach/ESCAPE/esc.htm

This course addresses the professional development needs of upper elementary, middle and high school science teachers in Wisconsin and neighboring states by offering an online Earth system science course in conjunction with the GETWISE project. ESCAPE investigates deforestation, volcanoes, hurricanes and ice shelf disintegration. GETWISE currently features two lecture series, one in Earth system science and another focusing on the solar system.

Two graduate credits are available through the University of Wisconsin-Madison's Department of Atmospheric and Oceanic Sciences upon successful completion of the ESCAPE course.

CONTACT: Margaret Mooney, Office of Space Science Education-Space Science & Engineering Center, University of Wisconsin-Madison, 1225 W. Dayton St., Madison, WI 53706, **Email:** mooney@ssec.wisc.edu.

Earth System Science Education Alliance (ESSEA)

http://www.cet.edu/essea

Sponsored by NASA's Earth Science Enterprise, ESSEA is an exciting and innovative professional development program for K–12 teachers. Participating universities, colleges and science education organizations are offering Earth system science online graduate courses to in-service and preservice educators. The courses use an innovative instructional design model, are delivered over the Internet and feature student-centered, knowledge-building virtual communities. A master teacher and/or Earth system scientist moderate participants, acting as guides and mentors throughout the 16-week courses. The three courses can be viewed at the following sites:

- Elementary School Teachers' Earth System Science Course: *http://www2.cet.edu/ete/hilk4/main.html*
- Middle School Teachers' Earth System Science Course: *http://www2.cet.edu/ete/5-8/main.html*
- High School Teachers' Earth System Science Course: *http://www2.cet.edu/ete/hil912/main.html*

The courses were developed within the Center for Educational Technologies (CET) at Wheeling Jesuit University. ESSEA is a partnership between CET and the Institute for Global Environmental Strategies, with the participation of 18 colleges and universities.

CONTACT: A listing of ESSEA participating universities and contact information, courses and schedules is available at *http://www.cet.edu/essea* (click on the link for "Course Offerings"). Course costs will vary by university. For general program information, contact: Claudia Dauksys, **Phone:** 703-312-0827, **Email:** essea@strategies.org.

Earth System Science Fellowship Program

http://research.hq.nasa.gov/code_y/code_y.cfm

The purpose of NASA's Earth System Science (ESS) Fellowship Program is to ensure continued training of interdisciplinary scientists to support the study of the Earth as a system. Particular emphasis is placed on the applicant's ability and interest in pursuing academic training and research using observations and measurements from NASA's Earth-orbiting satellites. NASA is especially interested in supporting investigations that fulfill a growing need in competencies relating to data assimilation and continuing improvement of remote-sensing techniques. Over 500 Ph.D. and M.Sc. fellowships have been awarded since the inception of the program in 1990, with plans to award up to 50 new fellowships annually.

Students admitted to or enrolled in a full-time M.Sc. or Ph.D. program in Earth system science or related disciplines at accredited U.S. universities are eligible to apply. Awards are made initially for one year and may be renewed annually, based on satisfactory progress as reflected in academic performance and evaluations by the student's faculty advisor, for no more than two additional years.

The deadline for application is typically March 15 of each year; the results are announced by June 30, with an anticipated award date of September 1 of the same year. Applications will be considered for research in any of the six focus areas established by NASA's Earth Science Enterprise: climate variability and change; atmospheric composition; carbon cycle, ecosystems and biogeochemistry; water and energy cycle; weather; and Earth surface and interior. The maximum amount of award is $24,000 per year.

CONTACT: Earth System Science Fellowship Program, Code YO, NASA Headquarters, Washington, DC 20546, **Phone:** 202-358-0855, **Email:** acrouch@hq.nasa.gov.

ESSE 21: Earth System Science Education for the 21st Century

http://esse21.usra.edu

Sponsored by NASA and managed by the Universities Space Research Association, ESSE 21 offers small grants to colleges and universities to encourage collaboration among educators and scientists in the development of Earth system science courses, curricula and degree programs. The objectives of ESSE 21 are to support and expand a diverse and active community of Earth system science faculty and scientists; to foster and enrich the grassroots development of high-quality, interdisciplinary Earth system science content using NASA data, research and resources; and to provide an infrastructure that supports the sharing, extension and leveraging of resources.

CONTACTS: Donald Johnson, **Phone:** 608-262-2538, **Email:** donj@ssec.wisc.edu; Martin Ruzek, **Phone:** 920-732-3316, **Email:** ruzek@usra.edu; Universities Space Research Association, 7501 Forbes Blvd., Suite 206, Seabrook, MD 20706, **Email:** esse21@usra.edu.

Federation of Earth Science Information Partners

http://www.esipfed.org

The Federation of Earth Science Information Partners (ESIP) brings together government agencies, universities, nonprofit organizations and businesses in an effort to make Earth science information available to a broader community. NASA is a sponsoring agency of the ESIP Federation.

The Federation's objective is to evolve methods that make Earth science data (satellite and ground-based) easy to preserve, locate, access and use for all beneficial applications, including research, education, commercial development, agriculture, land management, environmental monitoring, policy making and many other applications.

Visit the Federation Web site to learn about ESIP education services and products for elementary through college levels, informal education and professional development.

CONTACT: Dave Jones, President of the ESIP Federation, Columbia Corporate Park 100, 6021 University Blvd., Suite 140, Ellicott City, MD 21043, **Phone:** 410-203-1316, **Fax:** 410-203-9341, **Email:** dave@stormcenter.com.

Geospatial Workforce Development Center (GeoWDC)

http://www.geowdc.com

The GeoWDC at the University of Southern Mississippi is part of the National Workforce Development and Training Initiative (NWDETI) sponsored by NASA. The center is a customer-focused effort designed to meet workforce demands for the emerging geospatial industry, and its goal is to develop a well-trained geospatial workforce that will assist the U.S. in maintaining its leadership in geospatial technologies. The center's efforts are focused on five areas:

- **Leadership—**Activities include the Scholar in Residence program (semester sessions with geospatial practitioners/users) and Webcasts for distance learning.
- **Research—**The *Geospatial Technology Competency Model* can be used to design and develop degree programs and professional development workshops for geospatial professionals.
- **Information—**An online database can be searched by state for remote-sensing classes taught in community colleges.
- **Partnerships—**Including formal partnerships with organizations, as well as information exchange with groups and individuals.
- **Development—**Opportunities for learning and professional development include workshops, training approaches/packages, lesson plans for college educators and industry professionals and an online competency assessment tool.

CONTACT: Email: geowdc@usm.edu.

Goddard Coastal Research Graduate Fellowship Program (GCR)

http://gest.umbc.edu/student_opp/2004_gcr.html

NASA's Goddard Space Flight Center's (GSFC) Earth Sciences Directorate and Wallops Flight Facility, in collaboration with the Goddard Earth Sciences and Technology Center (GEST), led by the University of Maryland, Baltimore County, is offering a limited number of graduate student research opportunities. The program is scheduled for June 7 to August 13, 2004, and is designed to stimulate interest in interdisciplinary Earth science studies by enabling selected students to pursue specially tailored research projects on coastal processes in conjunction with Goddard scientific mentors.

The aim of GCR is to attract and introduce promising students in their first or second year of graduate studies to oceanography and Earth system science career options—through hands-on instrumentation research on coastal processes at NASA's Wallops Flight Facility on the Eastern Shore of Virginia. Each student will be teamed with a mentor with parallel scientific interests to jointly develop and carry out an intensive research project over the 10-week period. Most research will be done at the Wallops Flight Facility; however, there is the possibility that students will have the opportunity to participate in field programs at other locations as well. Mentors can include any Goddard Earth scientist, but most will be drawn from within the Observational Science Branch. Students will be expected to produce final oral and written reports on their summer research activities. The experience will likely help students to enrich their thesis or dissertation topic choices and broaden their scope of research tools.

The program is open to students enrolled in or accepted to accredited U.S. graduate programs in the Earth sciences, physical or biological oceanography, and biological or environmental science disciplines. Students will be selected on the basis of academic record, demonstrated motivation and qualification to pursue multidisciplinary research in the Earth or oceanographic sciences, clarity and relevance of stated research interests to NASA programs, and letters of recommendation. Women, minorities and individuals with disabilities are encouraged to apply. GEST is an Affirmative Action/Equal Opportunity Employer.

Students must commit for the specific full ten-week period. Participants must be either U.S. citizens or foreign nationals in U.S. schools who are either permanent residents or who possess a valid F-1 or J-1 visa. All selected students will be subject to a pre-employment security background check under the current security guidelines. Online applications and instructions can be found on the Web site.

CONTACT: Marci Delaney, Program Coordinator, GEST Center, Code 900.1, NASA Goddard Space Flight Center, Greenbelt, MD 20771, **Phone:** 301-286-4403, **Email:** mpdelane@umbc.edu.

Graduate Student Researchers Program (GSRP)

http://fellowships.hq.nasa.gov/gsrp/nav

GSRP awards fellowships for graduate study leading to masters or doctoral degrees in the fields of science, mathematics and engineering related to NASA research and development.

NASA's GSRP cultivates research ties to the academic community and broadens the base of students pursuing

advanced degrees in science, mathematics and engineering. Earth science research opportunities for graduate students are available at NASA Centers, including: Ames Research Center, Goddard Space Flight Center, Jet Propulsion Laboratory, Langley Research Center, Marshall Space Flight Center, and Stennis Space Center. Full descriptions of research areas that will be supported are provided on the GSRP Web site. Note that the GSRP also supports the Earth System Science Fellowship Program (see separate entry on p. 4) with NASA Headquarters.

Fellowships are awarded for one year as training grants not to exceed $24,000 and are renewable for a total of three years based on satisfactory academic advancement, research progress, and available funding. All applicants must be U.S. citizens currently enrolled or accepted as full-time graduate students in an accredited U.S. college or university. All applicants must have a faculty adviser from the institution where they plan to receive their graduate degree. An individual accepting this award may not concurrently receive other Federal fellowships or traineeships.

CONTACT: Visit the GSRP Web site for details about research areas that are supported, eligibility, proposal submission and the application process.

Graduate Student Summer Program In Earth System Science (GSSP)

http://gest.umbc.edu/student_opp/2004_gssp.html

The Earth Sciences Directorate at NASA's Goddard Space Flight Center (GSFC), in collaboration with the Goddard Earth Sciences and Technology Center (GEST), headquartered at the University of Maryland, Baltimore County, is offering a limited number of graduate student research opportunities. The program is scheduled for June 7 to August 13, 2004, and is designed to stimulate interest in interdisciplinary Earth science studies by enabling selected students to pursue specially tailored research projects in conjunction with Goddard scientific mentors.

There are 10 positions available at GSFC and two at GSFC's Wallops Space Flight Facility. Each student will be teamed with a mentor with parallel scientific interests to jointly develop and carry out an intensive research project over the 10-week period. Mentors will be drawn from within the four participating Earth science laboratories at Goddard: the Laboratory for Atmospheres, the Goddard Institute for Space Studies (in New York City), the Laboratory for Hydrospheric Processes, and the Laboratory for Terrestrial Physics. Students will be expected to produce final oral and written reports on their summer research activities. In addition, students are required to participate in an introductory lecture series on NASA research in the Earth sciences.

The program is open to students enrolled in or accepted to accredited U.S. graduate programs in the Earth, physical or biological sciences, mathematics, or engineering disciplines. Students will be selected on the basis of academic record, demonstrated motivation and qualification to pursue multidisciplinary research in the Earth sciences, clarity and relevance of stated research proposal to NASA programs, and letters of recommendation. Preference will be given to students who have completed at least one year of graduate study. Minorities, women and those with disabilities are encouraged to apply. GEST is an Affirmative Action/Equal Opportunity Employer.

Students must commit for the full 10-week period. Participants must be either U.S. citizens or foreign nationals in U.S. schools who are either permanent residents or who possess a valid F-1 or J-1 visa. All selected students will be subject to a pre-employment security background check under current security guidelines. Online applications and instructions can be found on the Web site.

CONTACT: Marci Delaney, Program Coordinator, GEST Center, Code 900.1, NASA Goddard Space Flight Center, Greenbelt, MD 20771, **Phone:** 301-286-4403, **Email:** mpdelane@umbc.edu.

GSFC/Howard University Fellowship in Atmospheric Science (GoHFAS)

GoHFAS is a partnership between Howard University and the NASA Goddard Space Flight Center's (GSFC) Laboratory for Atmospheres. The overall goal of GoHFAS is to facilitate the transition from undergraduate to graduate school by challenging students to solve open-ended problems and conduct research. This is accomplished through year-long interaction between students and mentors from participating organizations, including an eight-week summer program and travel back to the research site during the students' winter break to continue work on their projects. The ultimate goal is to increase the number of underrepresented minorities in the atmospheric sciences. Participants are juniors at U.S. universities with majors in the physical sciences, with an emphasis in atmospheric science, chemistry, physics, or related engineering disciplines. Students must have a minimum of one year of college-level calculus and physics or chemistry.

CONTACT: Sonya Smith, Howard University, **Phone:** 202-806-4837, **Email:** ssmith@howard.edu.

Howard University Program in Atmospheric Sciences (HUPAS)

HUPAS, a discipline within Howard University's graduate school, is a direct outgrowth of the Center for the Study of Terrestrial and Extraterrestrial Atmospheres (CSTEA), a NASA University Research Center. Howard University is the only Historically Black College and University that offers an advanced degree in the atmospheric sciences. HUPAS is committed to training students in atmospheric and space-based sciences, and actively engages students in CSTEA research. The program offers a wide array of graduate courses leading to a master of science or doctor of philosophy degree. These courses are taught in the physics, chemistry and mechanical engineering departments. Students work with a variety of research mentors from Howard University, NASA and the National Oceanic and Atmospheric Administration (NOAA). Graduate students may qualify for tuition, fees and stipend packages worth up to $34,000 per year.

CONTACTS: Vernon Morris, Director, Howard University Program in Atmospheric Sciences, 525 College St. NW, Washington, DC 20059, **Phone:** 202-806-9088, **Email:** vmorris@howard.edu; Demetrius Venable, Director, Center for the Study of Terrestrial and Extraterrestrial Atmospheres, Howard University, 2216 6th St. NW, Room 103, Washington, DC 20059, **Phone:** 202-806-5172, **Fax:** 202-806-4430, **Email:** dvenable@howard.edu.

Minorities Striving and Pursuing Higher Degrees of Success (MS PHD'S) in Earth System Science

http://msphds.marine.usf.edu

The MS PHD'S initiative was developed by and for underrepresented minorities with the overall purpose of increasing their participation in Earth system science. The program provides professional development experiences to help advance minority students who are committed to achieving outstanding Earth system science careers. The MS PHD'S initiative sponsors programs that provide participants with:

- Increased exposure to the Earth system science community, via participation in scientific conferences, mentoring relationships and virtual community activities;
- Improved professional skills (e.g., grantsmanship, research, communication, teaching, etc.) and development opportunities;
- Information regarding future funding, education and career opportunities and resources;
- Networking opportunities with established Earth system science researchers and educators; and
- Membership within a virtual community that facilitates networking with and collaboration among peers, junior- and senior-level researchers and educators.

The MS PHD'S in Earth System Science activities are designed to encourage and sustain the interests, as well as facilitate the full participation, of underrepresented minorities in Earth system science-related fields. Student participants are given structured assignments to further prepare them to achieve successful and productive Earth system science careers; create strategic plans to achieve their career goals; develop networks of peers, near-peers and scientists; identify and pursue educational and professional opportunities; and refine their presentations and communication skills.

CONTACT: Ashanti Pyrtle, College of Marine Science, University of South Florida, 140 7th Ave. S., St. Petersburg, FL 33701, **Phone:** 727-553-1301, **Fax:** 727-553-1189, **Email:** apyrtle@marine.usf.edu.

Minority University-SPace Interdisciplinary Network (MU-SPIN)

http://muspin.gsfc.nasa.gov

NASA created MU-SPIN to help train the next generation of NASA's minority scientists and engineers. The program has remained a highly effective tool throughout its growth and evolution over the past decade. MU-SPIN serves America's Historically Black Colleges and Universities (HBCUs) and Other Minority Universities (OMUs), which include Hispanic Serving Institutes (HSIs) and Tribal Colleges and Universities (TCUs).

The first step for the MU-SPIN program was to provide network infrastructure by helping minority schools to purchase, and even build, computers for the classroom. During its next phase, MU-SPIN established Network Resources and Training Sites (NRTS), allowing the program to expand and target a larger minority community of students, faculty, administrators and community members. Next, MU-SPIN established Expert Institutes to help foster scientific curriculum development and research with the goal of increasing participation in NASA-related science, especially Earth science. MU-SPIN also created the Institutes for Collaborative Research and Education (ICRE) model to further promote NASA science and technology in minority schools.

CONTACT: James Harrington, MU-SPIN Project Manager, Code 933, NASA Goddard Space Flight Center, Greenbelt, MD 20771, **Phone:** 301-286-4063, **Fax:** 301-286-1775, **Email:** james@muspin.gsfc.nasa.gov.

NASA Academy

http://www.nasa-academy.nasa.gov

The success of the U.S. space program is due in large part to cooperation between government, academia and the private sector. Although responsibilities overlap, leaders migrate from one sector to another and details change with administration, the interdependence among these sectors persists. One of the goals of the NASA Academy is to introduce future space leaders to how this system works.

The intent is to give a diverse group of students a working knowledge of NASA and its programs, and to create an environment that fosters creativity, personal initiative, leadership, teamwork, appreciation of diversity, and professional ethics. The Academy accomplishes this by augmenting research with a senior scientist or engineer with interactive sessions with leaders in government, industry and academia, a collaborative group project, lectures, field trips, and oral and written presentations. Students discover how NASA and its field centers operate, understand NASA's link to the private sector, gain experience in world-class laboratories, participate in a team environment and build professional bonds among our future leaders.

Upon successful completion of the Academy, students are inducted into the NASA Academy Alumni Association, which promotes and supports the mission of NASA and the Academy and helps establish a network for communication and support among alumni. Academy graduates often go on to complete advanced degrees and work at NASA Centers, for NASA contractors or in aerospace-related fields ranging from science and engineering to education and journalism.

The NASA Academy was started in 1993 at NASA's Goddard Space Flight Center (GSFC). NASA Academies are currently active at GSFC and NASA's Ames Research Center. Student eligibility requirements include:

- Demonstrated leadership qualities and interest in the space program;
- Enrollment (as of June 1 of the program year) as a junior, senior, or first- or second-year graduate student;
- A minimum B average; and
- U.S. citizenship, U.S. permanent residence (as of June 1 of the program year), or foreign national of a participating space agency.

The NASA Academy is co-sponsored by the National Space Grant College and Fellowship Program, which provides selected students with round-trip transportation to their assigned NASA Center and stipends between $3,000 and $4,000. Housing, meals and transportation are provided by the participating NASA Center. The University of Maryland's College of Computer, Mathematical and Physical Sciences is also a GSFC Academy co-sponsor, granting three credits to participants that successfully complete the program.

The deadline for submitting applications is January 31 of the program year, with the 10-week program held in the June–August time frame. Women, minorities and individuals with disabilities are encouraged to apply. See the Academy Web site for more details and online application.

CONTACT: David Rosage, University Programs Office, Code 603.1, NASA Goddard Space Flight Center, Greenbelt, MD 20771, **Phone:** 301-286-0904, **Email:** david.rosage@gsfc.nasa.gov. Applicants are also encouraged to contact their local state Space Grant Consortia Office, which can be found at: *http://calspace.ucsd.edu/spacegrant/contacts/allcontacts/allcontacts.html.*

NASA EOS Higher Education Alliance

http://reason.laits.gmu.edu

This project mobilizes NASA Earth Observing System (EOS) data and information through Web service and knowledge management technologies for higher education teaching and research. The technologies will be implemented in a standards-compliant, open, distributed, three-tier Web information system called GeoBrain, which will make petabytes of NASA EOS data and information accessible to higher education users, both professors and students. The system will allow users to dynamically and collaboratively develop interoperable, Web-executable geospatial service modules and models, and run them online against any part of the petabytes of archived data to get back customized information products rather than raw data.

This project will bring an unprecedented geospatial learning and research environment to the desktops of students and professors. To realize this goal, researchers and educators from higher education institutions throughout the United States will form the NASA EOS Higher Education Alliance (NEHEA). The NEHEA development team will develop the system, while representatives of the user communities will incorporate the data-enhanced environment into their existing courses and ongoing research, develop new courses that take advantages of the environment, provide feedback to the development team, and promote use of the system, products and tools developed. It's expected that more than 100 universities worldwide will use GeoBrain in teaching and research activities, with more than 1,000 copies of the client installed.

Professors and researchers at higher education institutions are welcome to join NEHEA as representatives of the user communities. Their involvement may be funded

through the Request for Participation (RFP) process managed by NASA's Earth Science Enterprise. Selected representatives will be funded for two years. An RFP is expected to be issued in March, and the selection will be made in June of each year for the first three years of the project.

CONTACT: Liping Di, Laboratory for Advanced Information Technology and Standards (LAITS), George Mason University, 9801 Greenbelt Rd., Suite 316-317, Lanham, MD 20706, **Phone:** 301-552-9496, **Fax:** 301-552-9671, **Email:** lpd@rattler.gsfc.nasa.gov or: ldi@mason.gmu.edu.

NASA Faculty Fellowship Program

http://www.asee.org/nffp

The NASA Faculty Fellowship Program (NFFP) offers hands-on exposure to NASA's research challenges through 10-week summer research residencies at participating NASA Centers for full-time science and engineering faculty at U.S. colleges and universities, including two-year institutions. Participants work closely with NASA colleagues on research that is important to NASA's five strategic enterprises.

Fellowships are awarded to qualified faculty members from engineering, science and other related disciplines for work on collaborative research projects of mutual interest to the fellow and the NASA Center. Each fellow will work with a NASA colleague and will be associated directly with the aeronautics and space program and the concomitant basic research problems. Fellows may reapply for a second summer.

The application deadline for the 2004 program was February 2. Approximately 150 fellowships are awarded each year. Stipends are $1,200 per week, and a travel allowance will also be paid. In addition, an allowance will be provided for those fellows who must relocate. Applicants should be aware that no leave will be granted during the 10-week period, and that fellows are required to conduct their research on-site. Faculty participants will be required to submit a research report and provide program evaluation data at the end of the program. NFFP is jointly managed by the American Society for Engineering Education (ASEE) and the Universities Space Research Association (USRA). The NFFP combines aspects of two successful former and long-running NASA programs, the NASA/ASEE Summer Faculty Fellowship Program and the NASA/USRA Joint Venture (JOVE) program.

CONTACT: Scott Potter, ASEE/NFPP, 1818 N St. NW, Suite 600, Washington, DC 20036, **Phone:** 202-331-3553, **Email:** s.potter@asee.org.

NASA GISS Institute on Climate and Planets (ICP)

http://icp.giss.nasa.gov

ICP is a research, science education and minority outreach program at NASA's Goddard institute for Space Studies (GISS). ICP engages students in grades 9–16 and teachers of grades 7–12 in Earth science research alongside world-class scientists. ICP is the GISS response to a national, state and local movement for scientific institutions to share in the responsibility of providing young people with the highest quality science, mathematics, and technical education. Its overall goal is to increase the pool of interested and academically qualified underrepresented minorities in the pipeline who are successfully completing high school science programs and baccalaureate programs in science, engineering and mathematics.

Through direct research experiences focusing on Earth's climate, ICP seeks to help students develop:

- Views of a world connected regionally and globally;
- Problem-solving skills; and
- Knowledge about the Earth system as it relates to science, technology and society.

Students and educators work on-site or remotely with scientists to create new knowledge that may help us better understand and predict Earth's climate. After-school research internships are available at GISS and cooperating universities. During school, ICP faculty members involve students in new or enhanced curriculum to develop climate change science literacy. Full-time summer enrichment programs offer a more intensive research experience. In-service and pre-service teacher workshops are also conducted to share curriculum. Several ICP spin-off program are also available as a result of faculty-scientist collaborations.

CONTACT: Carolyn Harris, ICP Director, GISS at Columbia University, 2880 Broadway at 112th St., New York, NY 10025, **Phone:** 212-678-5653, **Fax:** 212-678-5552, **Email:** charris@giss.nasa.gov.

NASA Opportunities for Visionary Academics (NOVA)

http://education.nasa.gov/nova

NOVA was created to develop and disseminate a national framework for enhancing science, mathematics, engineering and technology (STEM) literacy for teachers in the 21st century. Using NASA's strategic enterprises, facilities and resources, NOVA provides participating university and college faculty with enhanced knowledge and skills to implement change in university courses. This effort is accomplished through the demonstration of an undergraduate STEM course framework, examples of successful course

models and a mentoring support system for faculty wishing to implement new courses or modify existing ones at their universities or colleges.

NOVA invites interdisciplinary STEM and education faculty teams to participate in three-day workshops that are aligned with national education standards. After successful completion of a workshop, teams are eligible to submit proposals for grants of up to $34,000 for planning and implementing new courses for preparing K–12 teachers. See the Web site for team and application requirements. NOVA is funded by NASA and is implemented in cooperation with a consortium comprised of the University of Alabama, Fayetteville State University and the University of Idaho.

CONTACT: L. Michael Freeman, Aerospace Engineering and Mechanics, University of Alabama, Box 870280, Tuscaloosa, AL 35487-0280, **Phone:** 205-348-7304, **Fax:** 205-348-4171, **Email:** nova@coe.eng.ua.edu or mike.freeman@ua.edu.

NASA Summer School for High Performance Computational Earth and Space Sciences (HPC)

http://gest.umbc.edu/student_opp/2004_hpc.html

The NASA Goddard Space Flight Center's (GSFC) Earth and Space Data Computing Division (ESDCD) and the Goddard Earth Sciences and Technology Center (GEST) are soliciting applications from qualified graduate students to participate in an intensive lecture series in computational Earth and space sciences during a three-week period from July 5–23, 2004. The ESDCD provides comprehensive research and development support in data handling and computing for NASA Earth and space science research programs. Resident facilities include a 416-processor Compaq, a 1360-processor Cray T3E, a 512-processor SGI Origin 3000, numerous middle-sized supercomputing platforms, and several Beowulf-class systems. Beowulf is a class of inexpensive massively parallel systems designed as a cluster of commodity PC's using LINUX, first conceived at GSFC in the 1990s.

Approximately 15 students will be selected to participate in the three-week program. Students will be given hands-on computer training and interact in small groups. Staff and invited computational scientists will present a series of lectures on advanced topics in computational Earth and space sciences, with emphasis on computational fluid dynamics and particle methods. Lectures will be presented on developing software for massively parallel architectures. Students are encouraged to give a presentation of their thesis research interests during the course of the summer school.

The program aims to attract Ph.D. students in the Earth and space science disciplines whose present or future research requires large-scale numerical modeling on massively parallel architectures. Eligibility is limited to those Earth and space science students who are U.S. citizens and are enrolled in U.S. universities. Online applications and instructions can be found at the Web site.

CONTACT: Marci Delaney, Program Coordinator, GEST Center, Code 900.1, NASA Goddard Space Flight Center, Greenbelt, MD 20771, **Phone:** 301-286-4403, **Email:** mpdelane@umbc.edu.

National Space Grant College and Fellowship Program (NSGCFP)

http://www.hq.nasa.gov/spacegrant

NSGCFP funds support graduate and undergraduate students throughout the continental United States and Puerto Rico. The criteria for recruitment and selection are determined by the Space Grant consortia. However, all must be U.S. citizens and enrolled in a full-time degree program related to aerospace, which includes aeronautics, Earth and space science, space engineering and related fields. Designated Space Grant institutions provide specialized training and education programs to help maintain the nation's capabilities in aerospace science and technology and education and to capitalize on the multiple opportunities afforded by the space environment. Each state consortium is challenged to:

- Establish a national network of universities with interests and capabilities in aeronautics, space and related fields;
- Encourage cooperative programs among universities, aerospace industry, and federal, state and local governments;
- Encourage interdisciplinary training, research and public service programs related to aerospace;
- Recruit and train professionals—especially women, underrepresented populations and persons with disabilities—for careers in aerospace science and technology; and
- Promote a strong science, mathematics and technology education base from elementary through secondary school levels.

CONTACT: See Web site to connect to the NASA Space Grant institution in your state.

New Investigator Program (NIP) in Earth Science

The New Investigator Program (NIP) in Earth Science was established to promote the integration of Earth system science research and education by scientists and engineers at the beginning stages of their professional careers. The program, designed for investigators in Earth system science and applications at academic institutions and nonprofit organizations, emphasizes the early development of these individuals as both researchers and educators. Scientists and engineers are encouraged to develop a broader sense of responsibility for effectively contributing to the improvement of science education and the public science literacy—and are also provided an opportunity to develop partnerships and enhance their skills, knowledge and ability to communicate the results of their work to teachers, students and the public. Particular emphasis is placed on the investigator's ability to promote and increase the use of Earth remote sensing through the proposed research and education projects.

NIP proposals are openly solicited approximately every 18 months; the latest round of proposals were due August 15, 2003. The awards, to be provided in the form of "education grants," range from $80,000–$120,000 per year for a period of up to three years, subject to satisfactory progress and availability of funds. Proposals submitted in response to this announcement will be competing for approximately $2.0 million per year beginning in fiscal year 2004. Solicitations for new NIP proposals will be made available at: *http://research.hq.nasa.gov/code_y/code_y.cfm.*

CONTACT: Ming-Ying Wei, NASA Headquarters, Washington, DC 20546, **Phone:** 202-358-0771, **Email:** mwei@hq.nasa.gov.

Partnership Awards for the Integration of Research into Undergraduate Education (PAIR)

http://mured.nasaprs.com/awards/part_awards/pair/index.cfm

The purpose of the PAIR program is to integrate cutting-edge NASA-related research into the undergraduate educational experience, to strengthen teaching and research strategies across academic programs and to enhance collaboration among mathematics, science, engineering and technology (STEM) academic departments—thereby strengthening the STEM baccalaureate degree-producing capacity of a number of the nation's Historically Black Colleges and Universities (HBCUs) and Other Minority Universities (OMUs), which include Hispanic Serving Institutions (HSIs) and Tribal Colleges and Universities (TCUs). The PAIR program provides an opportunity for these institutions to build upon their NASA-sponsored and NASA-related research across academic disciplines by creating innovative approaches to the interdisciplinary study of STEM.

Partners may include NASA Centers and other institutions of higher education and the aerospace community having substantial involvement in NASA's mission to strengthen the MSET academic infrastructure of minority institutions. The awards are managed by NASA's Minority University Research and Education Programs (MUREP). PAIR Awards with an Earth science focus are:

- **Clark Atlanta University—**Integration of Research and Education in the Area of Earth Systems Science; Kofi Bota, **Email:** kbota@cau.edu
- **City University of New York City College—** Integration of Research and Education in Remote Sensing and Environmental/Climate Studies; Reza Khanbilvardi, **Email:** rk@ce-mail.engr.ccny.cuny.edu
- **Hampton University—** The Center for Lidar and Atmospheric Sciences Students (CLASS); Doyle Temple, **Email:** doyle.temple@hamptonu.edu
- **University of Puerto Rico at Mayaguez—** Partnership for Spatial and Computational Research; Luis Olivieri, **Email:** olivieri@ece.uprm.edu
- **California State University at Northridge—** Analyzing Data Sets; Carol Shubin, **Email:** carol.shubin@csun.edu
- **Norfolk State University—** Mission Leveraged Education: NSU-NASA Innovative Undergraduate Model; S. Raj Chaudhury, **Email:** schaudhury@nsu.edu
- **Heritage College—** Incorporation of Satellite Imagery Analysis in Environmental and Computer Science Curricula; Dr. James Falco, **Email:** falco_j@heritage.edu

CONTACT: Mabel Matthews, MUREP, Code N, NASA Headquarters, Washington, DC 20546, **Phone:** 202-358-0406, **Email:** mmatthew@hq.nasa.gov.

Satellite Observations in Science Education

The long-term goal of this project is to improve the teaching and learning of the Earth system through quality educational resources that make use of satellite observations. Strategies include:

- Creating effective tools and strategies for preparing students for careers in remote sensing;
- Promoting and supporting Web-based, remote-sensing learning activities; and
- Training students on the appropriate use of observations to address complex real-world problems.

A Web-based education environment is being developed to provide students at the post secondary level with interactive learning experiences on remote-sensing principles and exploratory data analysis. Real-time and historical data sets will be available for student inquiry, and interactive exercises are being developed that engage students to reflect on how scientists explore new concepts and answer questions. Also under development is a tool that will aid students in learning how to explore databases, so that an understanding of the world is attained through manipulations and discovery, rather than an examination of the world through simple point-and-click activities.

Contact: Steven Ackerman, University of Wisconsin-Madison, Cooperative Institute of Meteorological Satellite Studies, 1225 W. Dayton St., Madison, WI 53706, **Phone:** 608-263-3647, *Fax:* 608-262-5974, **Email:** stevea@ssec.wisc.edu.

Significant Opportunities in Atmospheric Research and Science (SOARS)

http://www.ucar.edu/soars

SOARS is dedicated to increasing the number of historically underrepresented students enrolled in master's and doctoral degree programs in the atmospheric and related sciences—with the goal of increasing ethnic diversity within the scientific community of the future. It provides undergraduate and graduate students with educational and research opportunities, mentoring, career counseling and guidance, and the possibility of financial support for a graduate-level program.

The program offers summer research internships, including a 10-week summer program at the National Center for Atmospheric Research or other national laboratories. The 10-week summer program typically starts in early June and continues through mid-August. Participants receive a stipend, housing and transportation costs.

SOARS was established by the University Corporation for Atmospheric Research through partnership with the National Science Foundation and support from the Department of Energy, National Oceanic and Atmospheric Administration, NASA, and the UCAR university community.

CONTACT: SOARS Program Office, University Corporation for Atmospheric Research, P.O. Box 3000, Boulder, CO 80307, Phone: 303-497-8622, Fax: 303-497-8629, Email: jwhite@ucar.edu.

Summer Institute on Atmospheric, Hydrospheric and Terrestrial Sciences

http://neptune.gsfc.nasa.gov/~fj2pg/sum_inst.html

NASA's Goddard Space Flight Center (GSFC) convenes an annual summer institute for undergraduate students that focuses on atmospheric, hydrospheric and terrestrial sciences. The first part of the program is a one-week series of lectures given primarily by GSFC scientists describing proposed areas of research in these subject areas. Based on these lectures and perceived compatibilities, students select a mentor and a desired area of research. The following nine weeks are devoted to an intensive research project with the mentor. Students are required to present their results orally at a closing symposium and in a written report. The program is directed at undergraduates majoring in one of the physical sciences, and who are in their junior year at the time of application. However, all undergraduates are eligible to apply. No previous experience in atmospheric, hydrospheric or terrestrial sciences is needed.

The deadline for receipt of applications is in February, with awards announced in March. All applications receive consideration, without regard to race, color, age, national or ethnic origin, or sex. Due to increased security restrictions at GSFC, acceptances are limited to U.S. citizens or those who possess a Green Card signifying their intent of becoming citizens. See Web site for application procedures.

CONTACT: Per Gloersen, Code 971, NASA Goddard Space Flight Center, Greenbelt, MD 20771, **Phone:** 301-614-5710, **Fax:** 301-614-5644, **Email:** per.gloersen@gsfc.nasa.gov.

Virginia Geospatial Extension Program

http://www.cnr.vt.edu/gep

The Virginia Geospatial Extension Program conducts targeted programs that promote the appropriate use of geospatial tools and applications, and integrate geospatial concepts throughout the K–20 educational pipeline. These tools and applications benefit our lives in many ways and

include the global positioning system (GPS), geographic information systems (GIS) and using remote-sensing data sources—satellite imagery and aerial photography—to provide innovative perspectives on local, regional, state and national issues. For example, GIS is to support urban planning, homeland security and to facilitate the management of environmental resources, including forests, wetlands, coastlands and endangered species.

The program is providing K–12 educational outreach in collaboration with the Virginia Space Grant Consortium's OVERspace program, specialized workforce courses and training through Virginia's Community College System and other VSGC member universities, faculty development, and linkages to NASA and other geospatial resources, data and programs. A key component of this program is its participation with Virginia extension agents, through Agriculture and Natural Resource programs and 4-H Youth Educational initiatives, to support the dissemination of information, training and application development at the grassroots level.

The program is sponsored by the VSGC and the Virginia Cooperative Extension, and is co-located at Virginia Tech in the College of Natural Resources and the College of Agriculture/Virginia Cooperative Extension.

CONTACT: John McGee, Geospatial Extension Specialist, 219 Cheatham Hall (0324), Virginia Tech, Blacksburg, VA, 24061, *Phone:* 540-231-2428, *Email:* jmcg@vt.edu.

Visiting Student Enrichment Program (VSEP)

http://gest.umbc.edu/student_opp/2004_vsep.html

VSEP offers students from the high school to graduate level summer internships with the Goddard Earth Sciences and Technology Center (GEST), working with scientists at NASA's Goddard Space Flight Center (GSFC). Students interact with scientists and professionals at a world-class facility, while gaining valuable experience through a project focused primarily on computer science or the application of computers to solve problems in other sciences. VSEP also holds field trips and lectures to broaden appreciation for GSFC's mission and activities. Past student projects have included simulating neural networks, preparing image analysis algorithms on supercomputers, developing computational science applications, and creating interactive Web sites.

GSFC facilities that offer the internships include:

- **The Scientific Computing Facility,** with its advanced computers (i.e., Cray T3E, Cray SV1's, SGI ORIGIN 2K and ORIGIN 3K, SUN E10000 and E6500, IBM RS 6000 SP), the world's largest UniTree mass storage system, as well as a visualization studio.
- **The National Space Science Data Center,** a central repository for the large databases generated from NASA spacecraft.
- **The Data Systems Technology Division,** which provides a full spectrum of hardware and software environments to support applied research and development of advanced solutions to operational problems.
- **Laboratory for Atmospheres,** which researches areas such as atmosphere modeling and climate analysis in support of Earth observing systems; and
- **Laboratory for Hydrospheric Processes,** which researches the oceanic, cryospheric and hydrologic sciences.

The 2004 VSEP runs from June 7 to August 13 at GSFC in Greenbelt, Maryland. (Subject to housing availability, high school students may need to begin or end later, depending on their academic calendar.) VSEP is open to full-time students in computer science, the physical sciences and mathematics. Participants must be either U.S. citizens or foreign nationals in U.S. schools who are either permanent residents or who possess a valid F-1 or J-1 visa. All selected students will be subject to a pre-employment security background check under current security guidelines. Online applications and instructions can be found at the Web site.

CONTACT: Visiting Student Enrichment Program, Code 900.1, NASA Goddard Space Flight Center, Greenbelt, MD 20771, **Email:** vsep@gsfc.nasa.gov.